DOCUMENT-IDENTIFIER: US 20020136902 A1

TITLE: Annealable imaging support

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[0034] Transparent magnetic layers suitable for use in the composite supports and imaging elements in accordance with the invention include those as described, e.g., in Research Disclosure, November 1992, Item 34390. Research Disclosure is published by Kenneth Mason Publications, Ltd., Dudley House, 12 North Street, Emsworth, Hampshire P010 7DQ, ENGLAND. The magnetic layer may contain optional additional components for improved manufacturing or performance such as crosslinking agents or hardeners, catalysts, coating aids, dispersants, surfactants, including fluorinated surfactants, charge control agents, lubricants, abrasive particles, filler particles and the like. The **magnetic particles** of the present invention can comprise ferromagnetic or ferromagnetic oxides, complex oxides including other metals, metallic alloy particles with protective coatings, ferrites, hexaferrites, etc. and can exhibit a variety of particulate shapes, sizes, and aspect ratios. Ferromagnetic oxides useful for transparent magnetic coatings include .gamma.**-Fe.sub.2O.sub.3,** Fe.sub.3O.sub.4, and **CrO.sub.2**. The **magnetic particles** optionally can be in solid solution with other metals and/or contain a variety of dopants and can be overcoated with a shell of particulate or polymeric materials. Preferred additional metals as dopants, solid solution components or overcoats are Co and Zn for iron oxides; and Li, Na, Sn, Pb, Fe,

PAT-NO: JP405006520A

DOCUMENT-IDENTIFIER: JP 05006520 A

TITLE: MAGNETIC RECORDING BODY

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CONSTITUTION: The **magnetic** recording body 1 is formed by forming the **magnetic** film on the surface of a base material 2 made of an Al alloy. This **magnetic** film 3 consists of the composite plating formed by combining and **dispersing** the Fe<SB>3</SB>O<SB>4</SB> **particles** 5 with and into the **matrix** metal 4 consisting of an Ni-Fe alloy. The grain size of the Fe<SB>3</SB>O<SB>4</SB> **particles** 5 is about submicron to several μm and the **magnetic** film 3 is formed to 10 to 15μm **thickness**. The reproduced output is improved in this way while the recording characteristics are enhanced.

DOCUMENT-IDENTIFIER: US 20020036031 A1

TITLE: Sintered rare earth magnet and making method

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[0033] The heat treating time is preferably about 10 minutes to 10 hours, more preferably about 1 to 5 hours, within which a composite layer, preferably having a thickness of 0.1 .mu.m to 3 mm, is formed on the magnet surface as a hydrogen embrittlement-inhibiting layer. The composite layer has fine particles of Sm.sub.2O.sub.3 and/or CoFe.sub.2O.sub.4 dispersed mainly in Co or Co and Fe as previously described. In the absence of a Co matrix, the composite layer is ineffective for inhibiting hydrogen embrittlement and itself acts to degrade the magnetic properties.

coating isolates the underlying substrate particle from bodily fluids that can
cause corrosion, degradation, or undesired absorption of the particle into
tissues. It can also provide a means of control over the **magnetic or**
**paramagnetic properties of the particle,** through changing the thickness of the
coating. The coated particles can then be mixed with activated carbon and the
pharmaceutical, as described in the Volkonsky patents referred to above.
Alternatively, the coated particles may be encased or encapsulated in an
organic polymer which (1) is biologically benign and (2) which will absorb the
pharmaceutical and release it in vivo. Examples of such polymers are albumin,
fluoropolymers, a cellulose polymer (such as sodium carboxymethyl cellulose), a
chlorinated olefin polymer, a polyamide, a poly(acrylic acid)-poly(alkylene
ether) graft copolymer, polymers of glycolide, lactide and/or caprolactone
(such as are commercially available from Birmingham Polymers, Inc.) or mixture
of gelatin and polymeric acid such as gum arabic, mannitol, and polyvinyl
pyrrolidone.

DOCUMENT-IDENTIFIER: US 20030026989 A1

TITLE: Insulating and functionalizing fine metal-containing particles with conformal ultra-thin films

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[0024] **In** addition, particulate metals are of interest, particularly particulate metals of the iron group, such as iron, cobalt and nickel, as well as various alloys. **Magnetic or paramagnetic particles** such as Fe, Co, Ni, Zn, Mn, Mg, Ca, Ba, Sr, Cd, Hg, Al, B, Sc, Ga, V, Ti, **In,** Fe.sub.3O.sub.4, **Fe.sub.2O.sub.3,** TiO.sub.2, ZnO, FeO or a mixture of any two or more of the foregoing are useful in electromagnetic applications, medical imaging applications and certain drug delivery applications, as described more below. Metal particles, especially particles, are useful absorbers or electromagnetic radiation. Magnetic or paramagnetic materials such as iron, nickel and or neodymium-iron-boron (Nd-Fe-B) permanent magnetic materials.

[0083] Coated particles of the invention, in which the particle substrate is a magnetic or paramagnetic material, can be used several ways in MTC processes. Suitable magnetic or paramagnetic materials include Fe, Co, Ni, Zn, Mn, Mg, Ca, Ba, Sr, Cd, Hg, Al, B, Sc, Ga, V, Ti, **In,** Fe.sub.3O.sub.4, **Fe.sub.2O.sub.3,** TiO.sub.2, ZnO, FeO or a mixture or alloy of any two or more of the foregoing. **In** one embodiment, **magnetic or paramagnetic substrate particles** that are coated with a passivating coating that is biologically inert, such as alumina. The

DOCUMENT-IDENTIFIER: US 20030030529 A1

TITLE: Induction devices with distributed air gaps

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[0016] The present invention is based upon the discovery that a distributed air gap insert or region may be provided for an inductor in a power system in which the insert comprises **magnetic particles** in a matrix of a **dielectric** material which **magnetic particles** have a particle size and volume fraction sufficient to provide an air gap with reduced fringe effects. The dielectric may be a gas, or a liquid, or a solid or a semi-solid or combinations thereof.

[0019] Alternatively, the **magnetic particles** may be coated with a **dielectric** material.

[0020] In another embodiment, the distributed air gap comprises a **dielectric** container filled with **magnetic particles** in a matrix of **dielectric** material. The container may be flexible.

[0031] FIG. 6A is a side sectional view of another embodiment of the invention employing a **dielectric** container filled with **magnetic particles** in a matrix of **dielectric** material;

[0035] FIG. 9A is a fragmentary sectional view of a core formed of one or more turns of a **dielectric** tube containing **magnetic particles** in a matrix of **dielectric** material;

[0036] FIG. 9B is a fragmentary detail of an embodiment

of the invention
employing a tube filled with **magnetic particles in dielectric** matrix.

[0057] FIG. 6A shows another embodiment of the invention in which a core 50 formed of a magnetic wire or laminations 51 has an air gap 52 and employs a distributed air gap insert 54 comprising a **dielectric** container 55 filled with magnetic powder particles 56 in a **dielectric** matrix 57 or coated **magnetic particles** as described hereinafter. The core 50 may comprise a spirally wound magnetic wire, as shown, or a ribbon of magnetic material, or a powder metallurgy material as discussed hereinafter. The core 50 has opposed confronting free ends or surfaces 58 imbedded in the powder forming an interface with the insert 54. The free ends 58 may be irregular or jagged to create a better transition zone in the interface where the permeability gradually changes from the core 50 to the air gap insert 54. In the embodiment shown, ends 53 of the laminations 51 at the interface may be alternatively off set to create the irregular or jagged end 58.

[0058] Alternately, as shown in FIG. 6B, the insert 54 may have a multi-component structure in which the central portion 55C is filled with the **magnetic particles** 56 in the matrix of **dielectric** material 57, and the end portions 55E are filled with short lengths of chopped magnetic wire 59, and which may exist without the **dielectric** matrix 57 as desired, to provide good electrical contact with the core 50 and a smooth magnetic transition into and out of the air gap insert 54. The interface may be planar or curved as desired.

[0063] The distributed air gap insert 76 is formed of powder particles 90

comprising **magnetic particles** 92 surrounded by **dielectric** matrix coating 94 (FIG. 8). The powder particles 90 have an overall diameter D.sub.0, a particle diameter D.sub.p, and a coating thickness D.sub.c as shown. The insert 76 may be formed or shaped as shown by molding, hot isostatic pressing the particles 90 or other suitable methods. For example, the matrix may be sintered, if the sintering process does not destroy the dielectric properties of the coating.

[0065] Alternatively, the coated particles 90 may be used to fill a container, hose or pipe as noted above. If the **magnetic particles** 92 have sufficient resistivity, they may be used alone without a coating and may further be combined with a gas, liquid, solid or semisolid **dielectric** matrix.

[0067] In the arrangement shown in FIG. 9C, if the entire core 102 is a filled hose, the entire core is thus a distributed air gap. Also, as shown in FIG. 9D, core 110 may be in the form of wound hose segments 112 filled with magnetic particles 114 (FIG. 9F). The insert 116 shown in FIGS. 9D & 9F may be formed of hose segments 118 filled with **magnetic particles** 120 in a **dielectric** matrix or coated **magnetic particles** discussed in greater detail hereinafter.

[0068] FIG. 9E shows a rectangular core 122 which may be formed as herein described as a full distributed air gap or with an insert 124 as shown. Although similar to the arrangement of FIG. 4, the arrangements of FIGS. 9A-9F have a different geometry. The **dielectric** material of FIG. 4 is solid, whereas in FIGS. 9A-9F **magnetic particles** may be distributed in a fluid **dielectric** such as air.

3. The induction device of claim 2, wherein: said air gap insert is a **dielectric** container filled with **magnetic particles**.

4. The induction device of claim 3, wherein: said **magnetic particles** are magnetic powder particles in a **dielectric** matrix.

15. The induction device of claim 14, wherein: said central portion is filled with **magnetic particles** in a matrix of **dielectric** material; and said end portions are filled with chopped magnetic wire.

16. The induction device of claim 14, wherein: said central portion is filled with **magnetic particles** in a matrix of **dielectric** material; and said end portions are filled with chopped magnetic wire in a matrix of dielectric material.